

# Questions from Homework/Lab

## Kinematics Review from Grade 10

### assign

### Return Quizzes and homework - go over

Get out your lab:

slope calculation with a triangle on the graph  
consistent scale

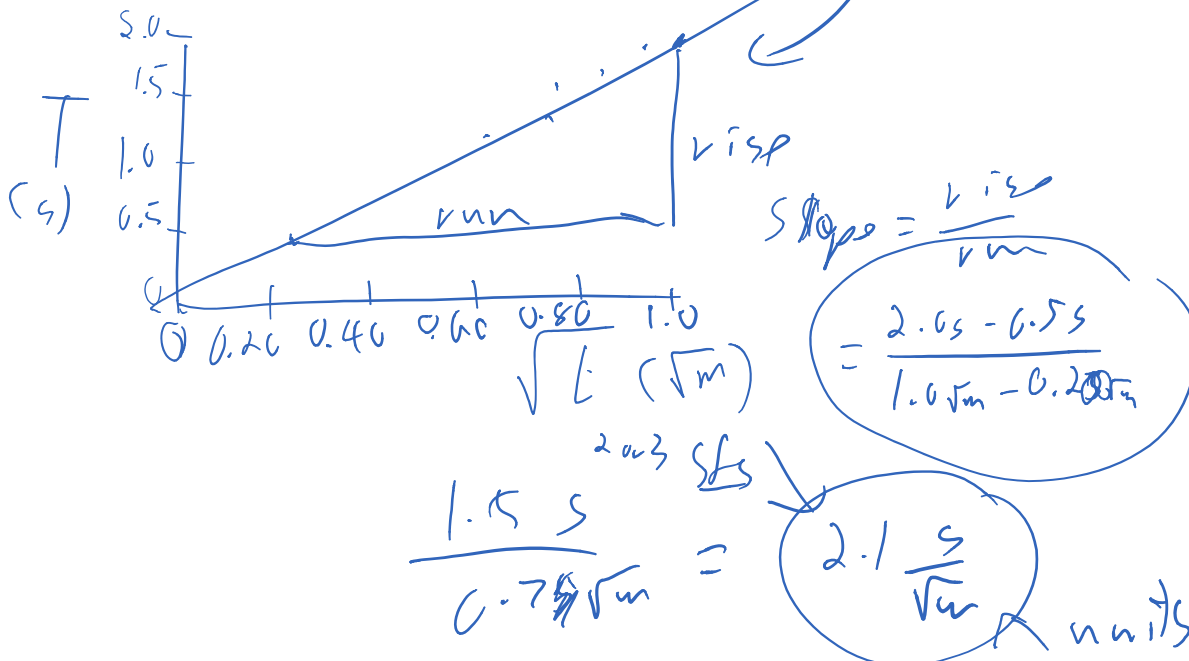
equation where all terms in  $y=mx + b$  are replaced

%error = |your slope - theoretical slope| / theoretical slope x 100%

theoretical slope =  $2 \pi / \sqrt{g} = 2.0 \text{ s} / \sqrt{\text{m}}$

$2.0 \text{ s} / \sqrt{\text{m}}$  ( $\sqrt{\text{m}} / \sqrt{100\text{cm}}$ )

$0.20 \text{ s} / \sqrt{\text{cm}}$  if you did your lab in cm



$$1.5/0.7=2.1429$$

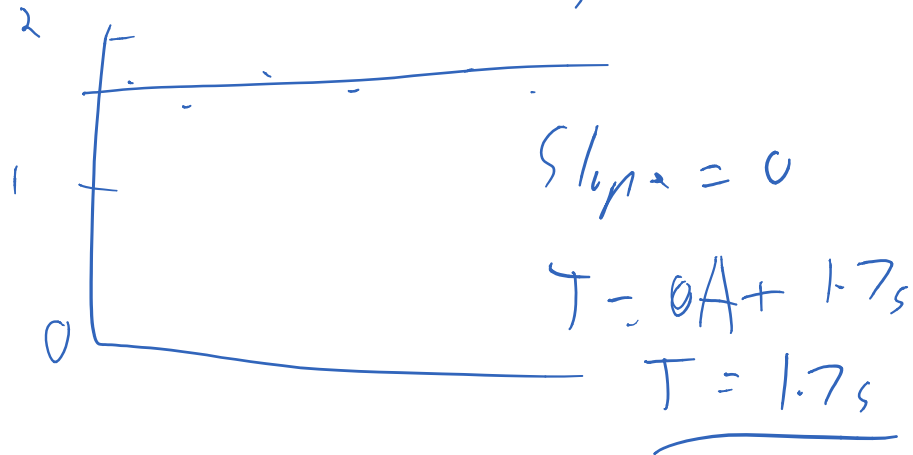
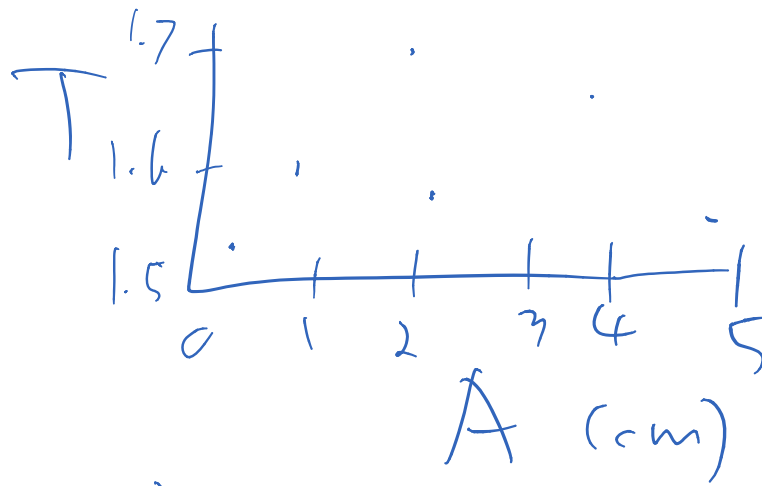
$$\% \text{ error} = \frac{\left| 2.1 \frac{\text{s}}{\sqrt{\text{m}}} - 2.0 \frac{\text{s}}{\sqrt{\text{m}}} \right|}{2.0 \frac{\text{s}}{\sqrt{\text{m}}}} \times 100\%$$

$$\frac{0.1}{2.0} = 0.05$$

5.0% error

$$y = mx + b$$

$$T = 2.1 \frac{s}{\sqrt{m}} \sqrt{L} + 0.1 s$$



## Kinematics

### motion description

define terms:

distance, symbol  $d$  or  $L$  - space between two points

scalar - no direction

units: metre,  $m$

vector - has direction

position, symbol  $x$ , the distance from a reference point with a direction.

units: metre, m and angle in degrees

displacement, symbol  $d$ ,

is a vector - include direction

- the change in position - position final,  $x_f$  - position initial,  $x_i$

eg. You are 3.0 m West of the door. You walk 1.0 m East and then 2.0 m West.

what is

- a) distance travelled
- b) displacement
- c) final position

a) 3.0 m

b) convention East is positive,

$$1.0\text{m} - 2.0\text{m} = -1.0\text{m}$$

1.0 m West

c) 4.0 m West of the door

speed is a scalar

symbol  $v$ ,

definition: how fast you are moving, velocity without direction

velocity is a vector

symbol  $v$ ,

definition: rate of change in position

$v = \Delta x / \Delta t$  - slope of a  $x$ - $t$  graph or a  $d$ - $t$  graph

if the velocity is constant, then

$$v = d/t$$

units of m/s

Jack runs 6 laps in 9 minutes and 16s. What is Jack's

- a) average speed

- b) average velocity
- c) instantaneous velocity when running North?

a)  $v = d/t = 6 \times 400 / (9 \times 60 + 16) = 4.3165$   
 4.32 m/s

b) change in position = 0 so  $v = 0$  on average

c) assume Jack is moving at a constant speed, then he will be moving at 4.32 m/s North.

Assignment:

p45-49 q1-8 CR 1.1-1.4 discuss next class

Quiz

$$72.3 \text{ cm} \left( \frac{1 \text{ m}}{100 \text{ cm}} \right) = \underline{0.723 \text{ m}}$$

b)  $\left( \frac{1 \text{ m}}{1000 \text{ mm}} \right) = \frac{6.0022 \text{ m}}{60.022 \text{ m}}$

c)  $51 \text{ nm} \left( \frac{1 \text{ m}}{10^9 \text{ nm}} \right) = 5.1 \times 10^{-8} \text{ m}$

1 Exp 9

2 604.1  $\rightarrow$  4 sf

208.000  $\rightarrow$  6 sf

3 a)  $3.25 \times 4.7 = 15.275 = 15 \text{ m}^2$   
 3 sf 2 sf  $\uparrow$

3sf 2sf

$T_{2sf}$

$$9.06/2.805=3.2299 \quad 3.23 \times 10^5 \text{ m/s}$$

3sf 4sf  $\rightarrow$   $T_{3sf}$

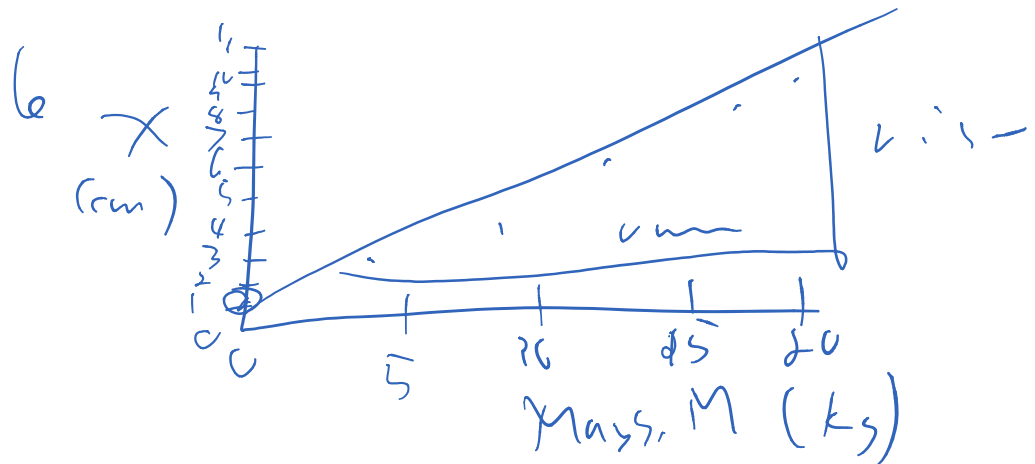
$$\begin{array}{r} 33.05 \\ - 32.046 \\ \hline 1.004 \end{array} = 1.00 \text{ cm}$$

5 density = mass/(lengthxwidthxheight)  
 $= 67.93/(5.28 \times 1.21 \times 1.105) = 9.6223 = 9.62 \text{ g/cm}^3$

3sf

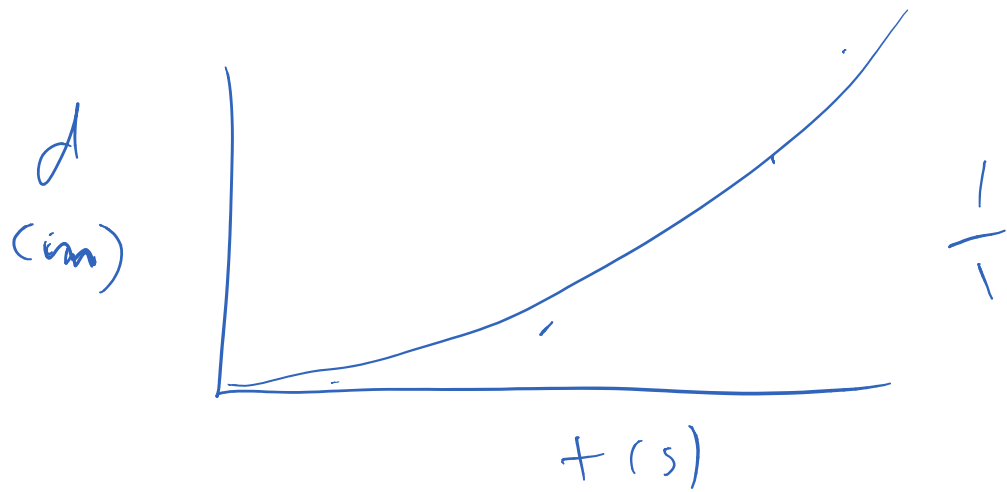
$$\% \text{error} = (9.62 - 7.86)/7.86 = 0.2239$$

$$\times 100\% = 22.4\%$$

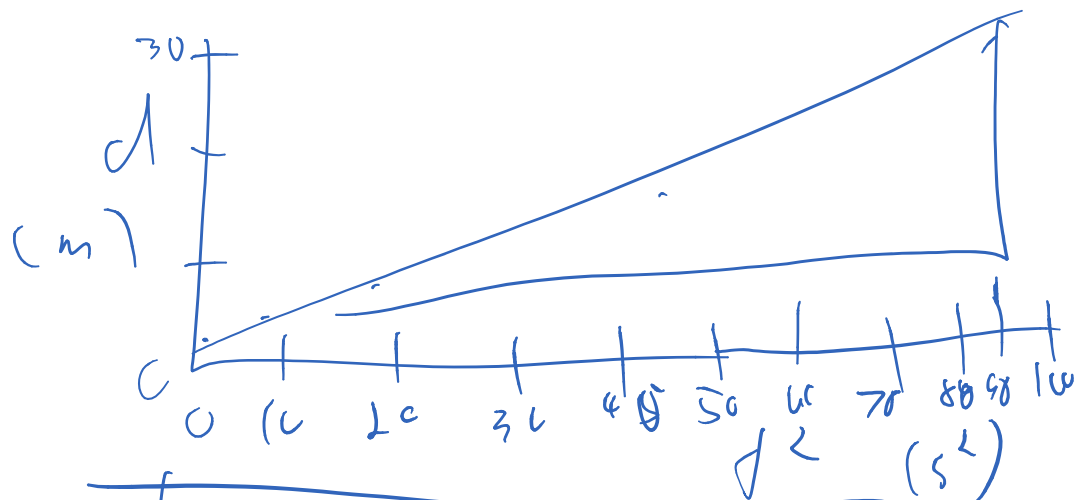


$$m = \frac{11.3 - 1.0 \text{ cm}}{20 \text{ kg} - 0} = 0.52 \frac{\text{cm}}{\text{kg}}$$

$$X = 0.52 \frac{\text{cm}}{\text{kg}} M + 1.0 \text{ cm}$$



t	t <sup>2</sup>
0	0
2	4
4	16
6	36
8	64
10	100



$$d = 0.28 \frac{\text{m}}{\text{s}^2} t^2$$

$$\frac{\sqrt{d}}{\sqrt{w}}$$

